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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/783,122	02/14/2001	Kouroche Kian	081400-006	2223

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EXAMINER

TRAN, BINH X

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 02/05/2003

5

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/783,122

Applicant(s)

KIAN ET AL.

Examiner

Binh X Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 February 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2, 4</u> | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

In page 1, the cross-reference to related application is objected because applicants do not include the application serial no. The examiner suggests the applicants to update this section. The updated information must include application serial no, filing date and the current status of the application in the cross-reference.

Claim Objections

2. Claims 7, 32 are objected to because of the following informalities:

In claim 7, "at least as small as" appears to have incorrect grammar.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 5, 9, 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 5, "in consideration of how well the at least one conductive layer absorbs radiation at particular wavelengths" (emphasis added) is subjective, vague and indefinite. The examiner has looked through the specification, however the examiner is

not sure what value would represent "how well" the conductive layer absorbs radiation at particular wavelengths

In claim 9, "swells a desired amount" is subjective, vague and indefinite. It is unclear from the specification what value range would represent "a desired amount" and what value range would not.

In claims 13 and 15, "broaden laser beam" is vague and indefinite. Since applicants define that excimer laser beam is part of the ultraviolet radiation and the ultraviolet must have a predefined wavelength, it is unclear what the term "broaden laser beam" actually mean.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-4, 16-18, 22-23, 25-27, 30, 32-33 are rejected under 35 U.S.C. 102(b) as being anticipated by Hichwa et al. (US 5,724,175).

Hichwa discloses a method comprising:

providing a multi-layered conductor/substrate which includes a plastic substrate (44) (col. 5 lines 58-60) and at least one conductive layer overlying the plastic substrate (col. 6 lines 1-18, Fig 2);

irradiating the multi-layered conductor/substrate with ultraviolet radiation such that portions of the at least one conductor layer are ablated there from (Fig 2, col. 6 lines 20-30, col. 7 lines 15-35).

Respect to claim 2, Hichwa does not explicitly disclose that the ultraviolet is "spatially incoherent". However, Hichwa clearly discloses that the UV radiation is ultraviolet excimer laser (col. 7 lines 30-35). It is known in the art that the excimer laser beam is naturally very spatially incoherent (See prior art make of record Morton et al. US 6067311 A). Since spatially incoherent is the property of the excimer laser itself. The examiner will interpret that Hichwa inherently discloses spatially incoherent. Respect to claim 3, Hichwa teaches the UV excimer laser have a wavelength of 193 nm (col. 7 lines 32-34). It is known in the art the UV has the wavelength from 4 to 400 nm. The examiner therefore interprets that the wavelength of 193 nm read on the limitation "wavelength in mid-UV range".

Respect to claim 4, Hichwa teaches irradiating steps comprise employing an excimer laser to ablate portions of the at least one conductive layer (col. 7 lines 1-35). Respect to claim 16-18, Hichwa discloses the excimer laser is configured to emit a light a discrete characteristic wavelength of 308 nm and 248 nm (col. 7 lines 30-34). Respect to claim 22-23, 25-26 Hichwa discloses the conductor comprise an oxide or alloy layer such as indium tin oxide (ITO) (col. 9 lines 16-20). Respect to claim 27-28, Hichwa discloses the conductive layer comprises a metal base layer (col. 9 lines 16-21). Respect to claim 30, Hichwa discloses the at least one conductive layer is a multi-layered conductive film (Fig 2). Respect to claim 32-33, Hichwa does not explicitly

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disclose the specific resistivity or transmissivity ranges of the conductive layer.

However, Hichwa discloses the same chemical composition with applicant for the conductive layer (i.e., ITO). Resistivity and transmissivity are the properties of material itself. Products of identical chemical composition cannot have mutually exclusive properties. A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present (See MPEP 2112.01).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 5, 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hichwa in view of Chrisey et al. (US 6,177,151).

Respect to claim 5, Chrisey discloses the step choosing the particular wavelength of the laser base on the absorption of the material (col. 8 lines 25-35, read on the limitation of "controlling the excimer laser ...at particular wavelength"). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Hichwa in view of Chrisey by controlling the absorption at a particular wavelength because it help us to determine the optimal wavelength for the process.

Respect to claim 28, Hichwa discloses the use of metal base layer such as gold. Hichwa fails to disclose the use of silver. Chrisey discloses the use of gold and silver

the conductive layer (col. 4 lines 60-63). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Hichwa in view of Chrisey by using silver because equivalent and substitution of one for the other would produce an expected result. Respect to claim 29, Chrisey discloses the use of metal alloy selected from the metal such as gold and silver (col. 4 lines 60-63).

9. Claims 6, 7 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hichwa in view of Mayer (US 4,752,455).

Respect to claim 6, Hichwa does not explicitly disclose the step of controlling the excimer laser to image a pattern from a mask onto the conductor layer. Mayer discloses the step of controlling excimer laser to image a pattern from a mask onto the conductor layer (Fig 1). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Hichwa in view of Mayer by controlling the laser because it would create a controllable size pattern.

Respect to claim 7, and 31 Hichwa fails to disclose the specific value of pattern line gap or conductive layer thickness. Mayer disclose that the diameter (D) of the pattern (read on the limitation "line gap") and the thickness (d) are result effective variables (col. 5, equation 1). The result effective variable is commonly determined by routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one having ordinary skill in the art, at the time of invention, to perform routine experiments to obtain the line gap and the thickness as an expected result.

10. Claims 12-15, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hichwa in view of Nowak (US 6,025,110).

Respect to claims 12-13, Hichwa fails to disclose the excimer laser is part of a projection ablation system. Nowak discloses the excimer laser is a projection ablation system (Fig 1). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Hichwa in view of Nowak by using a projection ablation system because this will be able to produce multi-level circuit boards with overlapping conductive traces. Respect to claim 14, Nowak discloses the projection ablation system is configured to project the laser beam onto a patterned mask (110) positioned over but not touching the conductive layer (Fig 1). Respect to claim 19, Nowak disclose the excimer laser is part of an ablation system configured to facilitate a roll-to-roll production process (Fig 1).

Respect to claim 15, the Hichwa fails to disclose the specific area of the patterned mask. The specific area value of the patterned mask is the result effective variable. The result effective variable is commonly determined by routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one having ordinary skill in the art, at the time of invention, to perform routine experiment to obtain optimal area as an expected result.

11. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hichwa in view of Kinoshita et.al. (US 6,300,594).

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Hichwa discloses the substrate made of plastic material. However, Hichwa fails to disclose a specific plastic material such as PET for the plastic substrate. Kinoshita disclose a substrate is made of plastic material for example PET and polycarbonate (read on "polyolefin" limitation, col. 8 lines 17-20). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Hichwa in view of Kinoshita by using PET or polycarbonate because Hichwa is not particular about the specific material for the substrate and therefore any plastic material would produce an expected result. Further, PET or polycarbonate is relative cheap and easy to make.

12. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hichwa in view of Logan et al. (US 4,093,345).

Hichwa fails to disclose the ITO layer is polycrystalline. However, Hichwa clearly disclose the use of ITO layer. Logan discloses that the ITO layer is polycrystalline (col. 4 lines 58-65). It would have been obvious to one having ordinary skill in the art, at the time of invention to modify Hichwa in view of Logan by using polycrystalline ITO because it has a uniform bulk resistivity.

13. Claims 8, 11, 34-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hichwa and Graff et al. (US 6,492,026) in view of each other.

Hichwa fail to disclose at least on functional layer made of insulating material intermediate the conductive layer and the plastic substrate. Graff disclose the insulating layer (125) intermediate the conductive layer (240) and the plastic substrate (105). It would have been obvious to one having ordinary skill in the art, at the time of invention,

to modify Hichwa in view of Graff by using the functional layer made of insulating layer because it will protect the substrate.

Respect to claim 11, Hichwa disclose controlling the excimer laser to without completely decomposing the layer therebeneath (col. 7). Respect to claim 34-36, 38 Graff discloses that the functional layer comprise a protective layer (125) which serve to protect the barrier layer (120) beneath the protective layer from environment damage (col. 3 lines 35-55). The use of laser irradiation has been discussed in Hichwa's reference. It would have been obvious to one having ordinary skill in the art, at the time of invention modify Hichwa in view of Graff by using the protective layer and barrier layer because it will protect the plastic substrate.

Respect to claim 37, Graff discloses that the functional layer comprise a polymer material. Graff further discloses that the polymer is acrylate-containing monomer or resins (col. 6 lines 20-25, read on "acrylic"). Respect to claim 39, Graff discloses the barrier layer is inorganic (col. 8 line 65 to col. 9 line 2). Respect to claims 40-41, Graff discloses the barrier layer has the oxygen transmission rate less than $0.005 \text{ cc/m}^2/\text{day}$ (Table 1, read on "no greater than $0.05 \text{ cc/m}^2/\text{day}$ ") and water vapor transmission rate (WVTR) less than $0.005 \text{ g/m}^2/\text{day}$ (Table 1, read on "no greater than $0.05 \text{ g/m}^2/\text{day}$ "). Respect to claim 43, Graff discloses additional functional layer (110) abutting a side of the plastic substrate (105) that face away from the conductive layer (240) to protect the plastic substrate. Respect to claim 42, Graff discloses the barrier comprise a silicon oxide (read on SiOx) abuts the plastic substrate (col. 9 lines 1-5).

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14. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hichwa in view of Graff and further in view of Dunskey et al. (US 6,433,301).

Respect to claim 9, Dunskey disclose the step of irradiate a portion of at least one conductive layer (24) such that a portion of the functional layer therebeneath (26 and/or 30) swell to form via (20a and or 20b) (read on heats and swell a desired amount, Fig 3). It would have been obvious to one having ordinary skill in the art, at the time of invention modify Hichwa/Graff in view of Dunskey by irradiate a portion of the conductive layer such that the layer therebeneath heats and swells a desire amount because this would create a via penetrate all the layer. Respect to claim 10, Dunskey teaches to control the fluence of the laser with respect to ablation threshold of the conductive layer (col. 12 lines 26-40).

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Morton et al. (US 6,067,311) disclose that the excimer laser beam is naturally very spatially incoherent (col. 2 lines 25-30).

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X Tran whose telephone number is (703) 308-1867. The examiner can normally be reached on Monday-Thursday and every other Friday.

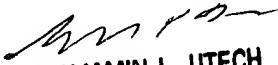
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703)

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872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Binh X. Tran
January 24, 2003


BENJAMIN L. UTECH
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